

BIOLOGY INVESTIGATORY PROJECT

ON

LINGUISTICS

EVOLUTION

AND

PEOPLE

Submitted by

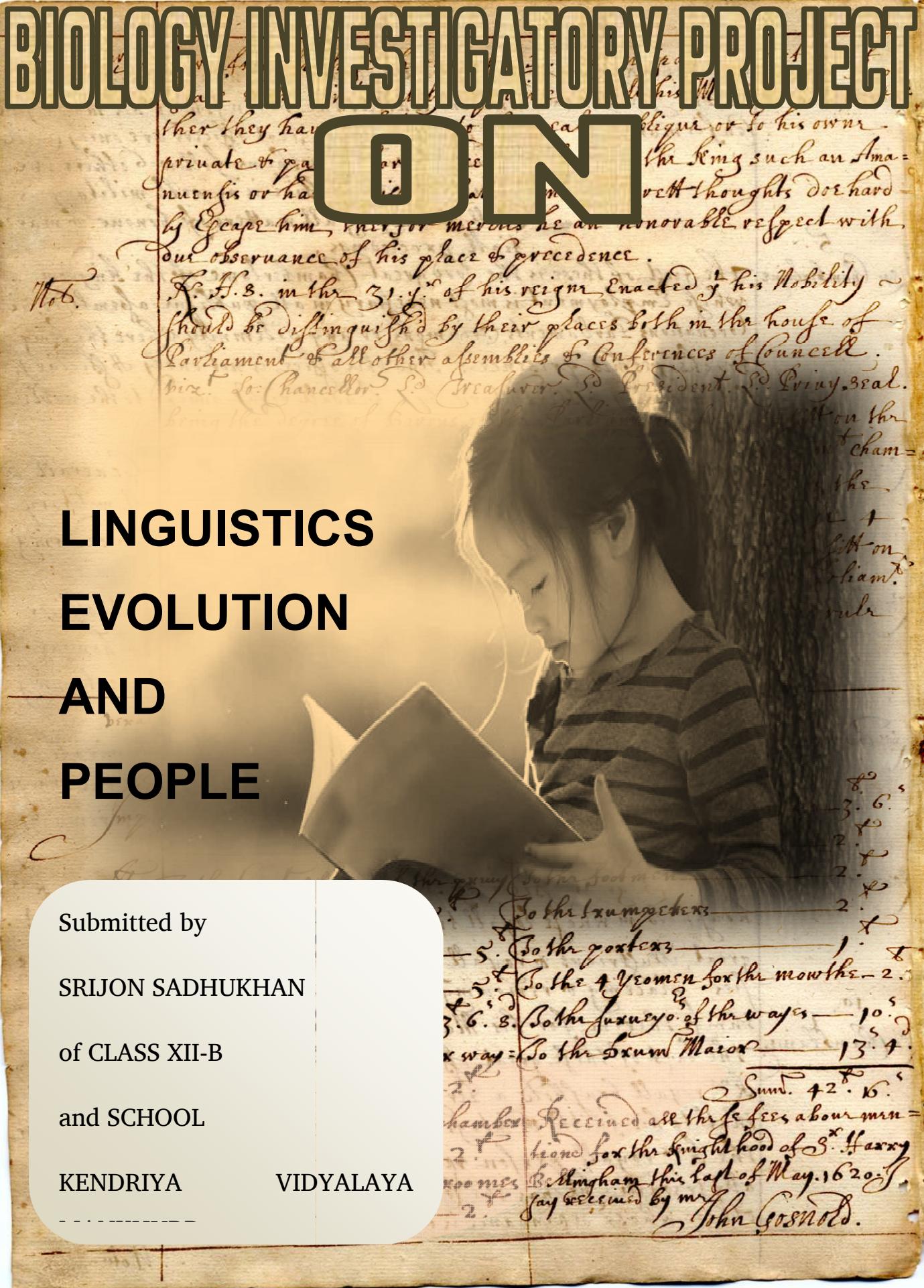
SRIJON SADHUKHAN

of CLASS XII-B

and SCHOOL

KENDRIYA

VIDYALAYA



**Understanding the degree of intelligibility of read literature
in English medium school children and to understand the
actual way of studying and grasping of the technical
literature in Indian context**

Thesis submitted for practical evaluation in AISSCE 2018-2019 in biology

Srijon Sadhukhan, XII B

Roll:

Kendriya Vidyalaya Mankhurd

2018-2019



**DEPARTMENT OF BIOLOGY
KENDRIYA VIDYALAYA MANKHURD
NAUSENA BAUG, MUMBAI – 400094**

CERTIFICATE

This is to certify that SRIJON SADHUKHAN, a student of class XII B has successfully completed the research on the below mentioned project under the guidance of Mrs. MUKTA SAXENA (subject teacher) during the year 2018-2019 in partial fulfillment of biology practical examination conducted by AISSCE, New Delhi.

Signature of the external examiner

Signature of the biology teacher

(i)

ACKNOWLEDGEMENT

I wish to express my deep gratitude and sincere thanks to the Principal, Mrs. Indra Devi Jain of K.V. Mankhurd, for her encouragement and for all the facilities that she provided for this project work. I sincerely appreciate her magnanimity by taking me into her fold for which I shall remain indebted to.

I extend my hearty thanks to Mrs. Mukta Saxena, biology teacher, who guided me to the successful completion of this project. I take this opportunity to express my deep sense of gratitude for her invaluable guidance, constant encouragement, immense motivation, which has sustained my efforts at all the stages of this Project work.

I can't forget to offer my sincere thanks to parents and also to my classmates who helped me to carry out this project work successfully and for their valuable advice and support, which I received from them time to time.

Srijon Sadhukhan

CONTENTS

INDEX

CERTIFICATE OF EXCELLENCE

ACKNOWLEDGEMENT

1. LANGUAGE
2. ORTHOGRAPHY
3. LEXICOGRAPHY

EMINENT BIOLINGUISTS

BIBILOGRAPHY

“Language is a system that consists of the development, acquisition, maintenance and use of complex systems of communication, particularly the human ability to do so; and a language is any specific example of such a system.”

1. LANGUAGE

1.1 Introduction: Orthography and Pronunciation

People all over the world are able to communicate orally, and the structural working medium becomes the language. Every major language has a proper writing system. Generally, these writing systems are based upon phonological aspects of each language. These writing systems or orthographies are known as phonemic (=phonetic) orthographies. For example, Turkish, Serbian, Russian, Sanskrit and Classical Arabic.

A spoken language always prefers a suitable script. German linguist Johann Christoph Adelung opined that, "*write as you speak and read as it is written*". This principle greatly influenced the making of several orthographies of different languages in Europe. This principle conserves the pronunciation of words in systematic phonetic way.

However, this is not always the case. Many major languages of the world have some problems regarding the pronunciation methodology with respect to the orthography. Just in the case of English:

Partly because English has never had any official regulating authority for spelling, such as the Spanish *Real Academia Espanola*, the French *Académie française*, and the German *Rat für deutsche Rechtschreibung*, English spelling, compared to many other languages, is quite irregular and complex. Although French, among other languages, presents a similar degree of difficulty

when *encoding* (writing), English is more difficult when *decoding* (reading), as there are clearly many more possible pronunciations of a group of letters. For example, in French, the /u/ sound (as in "food", but short), can be spelled *ou, ous, out, or oux* (*ou, nous, tout, choux*), but the pronunciation of each of those sequences is always the same. In English, the /u:/ sound can be spelled in up to 18 different ways (see the Sound-to-spelling correspondences section below), including *oo, u, ui, ue, o, e, ou, ough, and ew* (*food, truth, fruit, blues, to, shoe, group, through, grew*), but all of these have other pronunciations as well (e.g. as in *flood, trust, build, bluest, go, hoe, grout, rough, sew*).

These orthographic errors may happen if proper orthographic standardization procedures do not occur periodically.

Like the orthography of most world languages, English orthography has a broad degree of standardization. However, unlike with most languages, there are multiple ways to spell nearly every phoneme (sound), and most letters also have multiple pronunciations depending on their position in a word and the context. Several orthographic mistakes are common even among native speakers. This is mainly due to the large number of words that have been borrowed from a large number of other languages throughout the history of the English language, without successful attempts at complete spelling reforms. Most of the spelling

conventions in Modern English were derived from the phonetic spelling of a variety of Middle English, and generally do not reflect the sound changes that have occurred since the late 15th century (such as the Great Vowel Shift).

1.2 A study

Something similar has also been occurring with various North Indian languages (of Indo-Aryan language family), where even simpler words like

Devnagari	कर	→	कर
Hunterian	<small>Sanskrit</small> kara		<small>Hindi</small> kar
IPA	[kərə]		[kər]

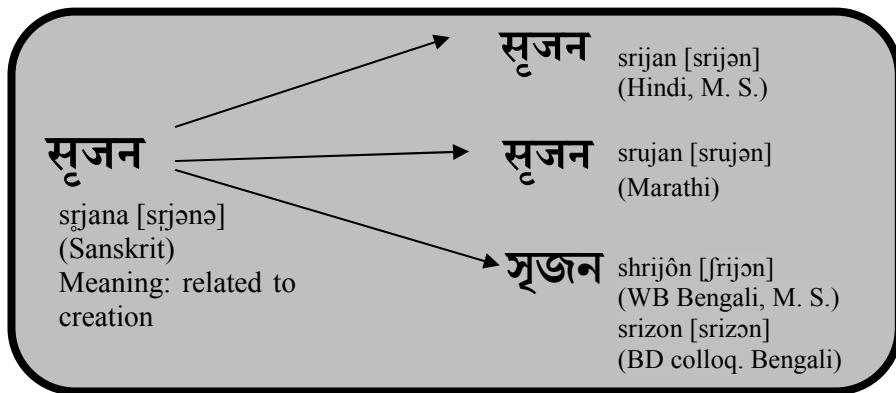
have transformed their pronunciation in due course of time. Technically speaking, from the transformation of Sanskrit into modern North Indian languages (evolution of Indo-Aryan language family).

Regional deviations can also be observed in a large extent in Indo-Aryan languages. Similar close deviations are also observed in Germanic, Balkan, Arabic and Turkic languages and dialects.

This phenomenon is supported by the “ease of speech” theory. That is, from time to time to comfort easiness, original pronunciations of words gradually tarnish or corrupt to form modern pronunciation. The above example of **कर** in Sanskrit and Hindi is true. Here, the original Sanskrit pronunciation *kara* [kərə] (lit. **do**) is changed to *kar* [kər] (lit. **do**) in Hindi and *kor* [kɔr] (lit. **do**) in Bangla.

The above phenomenon in Indological linguistics is well-known by the term “schwa deletion”.

Similarly, the actual pronunciation of the Sanskrit *ऋ* is actually lost and a new simpler pronunciation of *ri* (in Northern Hindi States) and *ru* (in Maharashtra and nearby) is emerged.



Simultaneously, the orthography-pronunciation equilibrium starts misbalancing. New conventions on language reading practices are formed and the process continues indefinitely. Consequently, when the original Sanskrit vocabulary was being incorporated for the first time in Indian languages (in modern or *Colonial* times), the orthographical structure remained the same but pronunciation methods differed. The above chart depicts that situation.

1.3 Orthography

At some point of time, people start feeling the awkward usage of the orthography very inconvenient. New learners and *people who are not very interested in language studies but really need it* may feel uncomfortable and confusing.

The Devanagari alphabet, although very much claimed by the Indian Government as the best suited script to write various languages and a prestige symbol of Indian culture and heritage do have some “*contradictory to common assumption*” facts based according to the scientific principles set up by linguists for a perfect orthography.

- 1) Proper usage of the *halanta* is not observed, either in transcribing or in phonetic writing in Hindi.
- 2) Confusing and non-standardized maintenance (or constancy) of usage of conjunct consonants *yukta-akshara*.
- 3) Systematic construction of conjunct consonants not observed.
- 4) Proper standards of orthography not followed by all published books till date.
- 5) The usage of vowel symbol for *chhoti i ki matra* is not scientifically logical with respect to direction as per linguistic experts, etc.

Beginners and speakers of Hindustani language (Hindi-Urdu) do find it very difficult to mentally decode texts in either or both of the official scripts, i.e. the Devanagari and the Arabic script. Subsequent increase in importance of English has led to an experimental start of usage of Roman script based orthography of Hindi, from the Colonial times. 1870s were the time for the initiatives taken for this script-change (*The Roman Urdu Journal, Lahore, 1873-1874*). Then major publications, Government newsletters etc. like the *Sainik Samachar* in Hindi started using 3 scripts altogether functionally. Still common people insisted usage of the

traditional scripts. Post Independence and Anti-Hindi Agitations, usage of Hindi started slowly declining in common places and events as a technical language. The 1990s became the peak moment when people started adopting Information Technology in workplace and in personal sphere, lack of software developments in usage of Indian languages in computer led to deviation from common usage of Devanagari and other Indic scripts for Indian languages. Even after all these software technologies developed completely in the last five years, people did not stop using English keyboards for typing Hindi and its regional counterparts.

Aftermath

Usage of Devanagari script remained confined in Government workplaces concerned in “*spreading the Hindi language*” and in Hindi lingosphere to some extent. Ironically even after all these softwares and script related technological issues resolved, filmmakers almost completely stopped using the Devanagari script, once compulsorily used for making posters for films along with the Arabic script. Chatting and Emailing still occurs in both English and Hindi, but both languages in function rely on the Roman alphabets. Further, mistakes in making Government posters and typing official documents still persist remarkably, and people feel better preferably using the English versions of all documents and websites consequently.

1.4 Vocabulary

Artificial insertion of technical vocabulary has been a major part in the evolution of many major languages of the world, particularly English and French (from Latin and Greek), Korean and Japanese (from English), some Turkic languages like Azerbaijani and Uyghur (from Arabic and Persian) and Hindustani (M.S. Hindi register – from Sanskrit; M.S. Urdu – from Arabic, Persian and English).

However, some languages still rely on native roots in word formations for academic usage in them, particularly, Turkish (using proto-Turkic), North Korean, Hebrew and Mandarin (*self-reliability*). This option, *self-reliability*, ensures benefits in better intelligibility of literary texts and improves deep understanding on the subject concerned with. Concepts are cleared easily and various phenomena are understood quite better. This concept can also be politically motivated as it may include nationalistic values.

Moreover, adopting technical loanwords require additional **vocabulary skills** in mental decoding of terms. For examples, Mandarin uses simple layman words to coin Biological terminology in its actual sense, whereas English refers to the Latin vocabulary to coin terms to determine its functional *specialty*.

The case of Chinese Mandarin

The Government of PRC officially uses **calque** or loan translation, word-to-word or root-to-root translation for formation of various terminologies in professional or technical fields. For example, the word *telephone* is translated in Chinese 电话 or *diàn huà* which literally means “electric speech”. Although loanwords do exist, but due to nationalistic policies and for the easiness in comprehensibility of the Chinese readers, these words are coined from simple native roots.

What about Indian languages?

Aryan

These were the languages used in ancient India. Sanskrit is unambiguously revered as a literary language of the Elites. Although a few out of the historians opine (or claim) of Sanskrit being necessarily a spoken language, till then it can be taken as a sister language of all spoken languages as normally as possible in Ancient times. Pali-Prakrit and Modern Indo-Aryan languages are known as the off-shoots of Sanskrit. Many primitive forms of Hindi roots are found in Sanskrit morphologically.

Hindi was used as a literary language just after evolving as a common speech in modern masses into its current form (along with its regional variants). It has a large amount of poetic resources dating back to around 10th century, somewhere around the initial days of the arrival of the Turkic

rulers in the subcontinent. This medieval period continued until the Colonial era began.

However, for the recent one-and-a-half century, due to various proposals and disputed colonial policies, Hindi writers started using a lot of Sanskrit vocabulary for technical usage in official documents and other literary texts. The fact in defence of this usage was that Sanskrit word formation was much more systematic as compared to other vernacular Indian languages. Unfortunately, this systematic way did not work successfully for a long period of time and lesser number of actual Hindi speakers (M.S.) do understand the Sanscritic terminologies, let alone they use it commonly. This policy, not only made official Hindi almost impossible to understand, but its artificial-looking texture made it into a lesser user-friendly communicative option to the people.

On the other hand, the much popular Bollywood encourages use of a much Persianized colloquial version of Hindi used in romantic poetries and lyrics. **And due to diminishing importance of Hindi-Urdu, its rich authentic vocabulary, and decrease in studies on it, more and more words solely originating from Hindi are falling into disuse, just like discarding any part of body of an organism in disuse to form merely a vestigial part of body.** Like, for the following example, the word *janna* जनना that is, o give birth.

Normal Hindi: और वो बेटा जनेगी और तू उसका नाम यीसु रखेगा.

(from The Roman Urdu Bible, a pre-colonial text)

Hindi, M.S. (R.O.I): और वो पुत्र जन्म देगी और तू उसका नाम यीसु रखेगा.

“The language of friendship is not words but meanings.”

Henry David Thoreau

“The cornerstone of education is an easy system of reading and writing. The key to this is the new Turkish alphabet based on the Latin script.”

Mustafa Kemal Attaturk

2. ORTHOGRAPHY

2.1 Orthography

A **writing system** is any conventional method of visually representing verbal communication. **Orthography** is a set of conventions for writing a language. It includes norms of spelling, hyphenation, capitalization, word breaks, emphasis, and punctuation.

India uses a variety of Writing System. These writing systems are mostly nearly-phonetic in nature. Major official writing systems here in India are classified as **alphasyllabary**, a segmental writing system in which consonant–vowel sequences are written as a unit. But they are not approximate in their functions phonetically. A slight divergence is seen in Hindi, and a grave deviation is observed in Bangla orthography.

করে [kore] he does

করে [kore] (by)doing

These alphabet do have similarities originally, however, their complex functions are, in the present situation, is not favourable.

2.2 Misuse and Disuse

It may generally be seen that these distinct writing systems often form the basis of ethnic pride and identity in psychological terms. Radical leaders may misuse these writing systems (*not understanding the basis of*

mechanism of these writing systems) and languages for political gains (greed, brainwash) depending on the social contexts. However, if actual problems regarding proper orthography is not addressed, sudden problems regarding hereditary flow of information may occur at some or the other point of time. For example, Ottoman Turkish beginners had a tough time learning how to read due to orthographic complexities. Above table on the word **করে** too shows problems in accuracy in proper phonetic transcription (*defective orthographies*).

A burden of certain orthographies even without functional perfection may not suit many people representing any speaking community if one belongs to any multilingual society. Many originally designated non-Hindi people do not necessitate learning the orthography of their own tongue. It may slowly but gradually lead to a disappearance in reading tradition in these scripts (or orthographies).

2.3 What should be done?

- 1) Surveying of pan-national opinion on orthography and basic and personal orthography skill of national population.
- 2) Researches and studies on orthographies, phonetics, and other people-centered linguistic aspects should be thoroughly done thereafter.
- 3) A proper decision based on official writing system should be taken.
- 4) Proper phonetic order and grammatical rules should be taken care of while preparing a standard orthography.

5) Suitable (better, a global) writing system should be adopted keeping in mind the social circumstances in different parts of the nation and each orthographic problem should be thoroughly checked and solved.

I am of this opinion that our own tung should be written cleane and pure, unmixt and unmangeled with borowing of other tunges; wherein if we take not heed by tiim, ever borowing and never paying, she shall be fain to keep her house as bankrupt.

John Cheke

Bad writers, and especially scientific, political, and sociological writers, are nearly always haunted by the notion that Latin or Greek words are grander than Saxon ones, and unnecessary words like expedite, ameliorate, predict, extraneous, deracinated, clandestine, subaqueous, and hundreds of others constantly gain ground from their Anglo-Saxon opposite numbers.

George Orwell

3. LEXICOLOGY AND UNDERSTANDING

3.1 Lexicology

Lexicology is the part of linguistics that studies words. This may include their nature and function as symbols, their meaning, the relationship of their meaning to epistemology in general, and the rules of their composition from smaller elements (morphemes such as the English *-ed* marker for past or *un-* for negation; and phonemes as basic sound units). Lexicology also involves relations between words, which may involve semantics (for example, *love* vs. *affection*), derivation (for example, *fathom* vs. *unfathomably*), use and sociolinguistic distinctions (for example, *flesh* vs. *meat*), and any other issues involved in analyzing the whole lexicon of a language.

3.2 Lexicology, Sociology and Psychology

Vocabulary has naturally been a major subject in social linguistics. It determines the chronological evolutional changes of any language going through social, economical and political changes. People have been adapting changes with changing surroundings that is what known as evolution. Something happens with daily usage of tongues as well.

During the ancient times, Sanskrit as a literary language used to coin terms from its own contemporary vocabulary. This is evident in its documents and their English translations. English translators had substituted those terms simply by simple English terms, contrary to the social and literary conventions of converting them into their Greek and Latin counterparts. (see **1.4** for further information)

From the beginning of rule of Delhi Sultanate and Mughal Empire, there came a large influx of Turko-Perso-Arabic vocabulary in modern Indian languages, and *adaptation to progress* led people to absorb these exotic words in common usage. Literature gradually developed with slight changes and structural formation changed with change in vocabulary.

This phenomenon again repeated in Colonial rule (and continues to this day). *Psychological authority* on colonial natives by historical processes like colonial rule (by European powers) and Russification (in soviet rule) paved way to another great influx of foreign terms in native usage. A bulk of English words is included in colloquial speech in India and other developing nations as there is a tendency of observable *intra-cultural mental subordination*. Such nations also tend to give superficial importance of languages of colonial rulers over native speech.

Turkey

Ironically, a nation with similar cultural background, Turkey, doesn't show such tendencies. It encourages usage of terms coined in the native language (Turkish) in original terms. Although the Turkish Language Association (a regulatory body for the Turkish Language) has also

incorporated many European-origin words in the meanwhile, the national policies do not encourage any developmental activity at the cost of Turkish language and its importance.

Swahili

Similar case has also been with Swahili and indigenous languages in Tanzania. A former British colony in Africa, Tanzania's president and ruling authorities 'dumped' English as the linguistic diversity was at danger.

3.3 But... let's think

Take German. It uses its own Germanic technical vocabulary to form its own words, functionally allied with the eventual usage of Latin counterparts. Everybody is aware of the scientific legacy of the Germans, well!

J.H. Campe was one of the most influential supporters of the Enlightenment, who, after the French Revolution, worked nearly exclusively on the German language. He was of the opinion that **only a pure German language, comprehensible to every citizen, would lead to the general enlightenment of the German people**. He compiled the five volumes of his *Wörterbuch der Deutschen Sprache* (*Dictionary of the German language*) and the *Wörterbuch zur Erklärung und Verdeutschung der unserer Sprache aufgedrungenen fremden Ausdrücke* (*Dictionary for explaining and Germanizing the foreign expressions imposed on our language*).

According to Kirkness (1998: 411), the Berlin artist Karl Wilhelm Kolbe had an aesthetic approach to language and regarded language as a complete unity. He was of the opinion that foreign lexical influences on German could potentially lead to a change in its structure, to the abandonment of its singularity, and finally to its extinction. He assumed a strong connection between language and nation, and his books *Über den Wortreichthum der deutschen und französischen Sprache* and *Über Wortmengerei* are characterised by an extreme tone and frequent exaggerations which were common during the time he was writing. They must be understood as a patriotic act against the fear of French domination in general, which is a very common manifestation of Gardt's *sprachideologischer Fremdwortdiskurs*, where the purist does not criticize a foreign language but a foreign culture.

But, taking scientificity and simple consciousness in mind, one should ask himself, is the text read by me is **purely comprehensible** by me? do I understand the basic meaning of words correctly? Do I use the word considering its meaning in basic sense?

What about a child studying in an Anglophone (English-speaking) environment is supposed to do to fully understand texts with a clear understanding of word-formation? Searching dictionaries for learning word roots of Greek and Latin origin for “learning words” all the time?

Here comes Linguistic Purism to rescue. However, the motive of purism should be much social rather than political. Even Tamil language has this purism, but that effort may become futile. For example, they have even translated ‘Deoxyribonucleic Acid’ and other compounds into their own chemical terms, but the style of language they used was more literary and less colloquial, and hence, in turn, be much incomprehensible in usage.

3.3 What should be done?

Adopting the Turkish model, *Sino-related* model and other models from the world.

- 1) Word roots should be rediscovered which are authentic just to Hindi or related modern dialects/languages.
- 2) Counterpart word roots, if not found originally, should be derived from its archaic forms by a systematic process

This systematic process should be based on the observations on the

Periodic simplification (= evolution) of the (modern) word roots, for example, studying of simplification of the Sanskrit word कण to form कान.

Word formation system, for example, चौबरसी which means “four-yearly” is made from “chau” (a prefix for “four”) and “barsi” (a root for “year”).

- 3) Systematic coinage of terms and their proper popular propagation is required.

- 4) Simultaneous official usage should be hereby initiated.
- 5) Calque or loanword translation should be followed for import of foreign terms (pertaining to professionalism).

Eminent Biolinguist

Eric Lenneberg

Eric Heinz Lenneberg (19 September 1921 – 31 May 1975) was a [linguist](#) and [neurologist](#) who pioneered ideas on [language acquisition](#) and [cognitive psychology](#), particularly in terms of the concept of innateness. He was born in [Düsseldorf](#), Germany. Ethnically [Jewish](#), he left [Nazi Germany](#) because of rising [Nazi persecution](#). He initially fled to Brazil with his family and then to the United States where he attended the [University of Chicago](#) and [Harvard University](#). A professor of [psychology](#) and [neurobiology](#), he taught at the [Harvard Medical School](#), the [University of Michigan](#) in Ann Arbor and [Cornell University](#) and Medical School.

Lenneberg's 1964 paper "The Capacity of Language Acquisition," originally published in 1960, sets forth seminal arguments about the human-specific biological capacity for language, which were then being developed in his research and discussions with [George A. Miller](#), [Noam Chomsky](#), and others at [Harvard](#) and [MIT](#), and popularized by [Steven Pinker](#) in his book, [The Language Instinct](#). He presents four arguments for biological innateness of psychological capacities, parallel to arguments in biology for the innateness of physical traits:

- Universal appearance of a trait at a single time across a species. "Species typical" traits.
- Universal appearance across time for a group. Not just an artifact of cultural history. Again, "species typical" diagnostic feature.
- No learning of the trait is possible.
- Individual development of a trait rigidly follows a given schedule regardless of the particular experience of the organism.

In his publication *Biological Foundations of Language* he advanced the [hypothesis](#) of a [critical period](#) for language development; a topic which remains controversial and the subject of debate. Lenneberg's biological approach to language was related to developments such as the [motor theory of speech perception](#) developed by [Alvin Liberman](#) and colleagues at [Haskins Laboratories](#) and also provided historical antecedents to issues now emerging in [embodied philosophy](#) and [embodied cognition](#).

Lenneberg reargued extensively against the psychological implications of the work of [Edward Sapir](#) and [Benjamin Lee Whorf](#), specifically in regards to the [idea that](#)

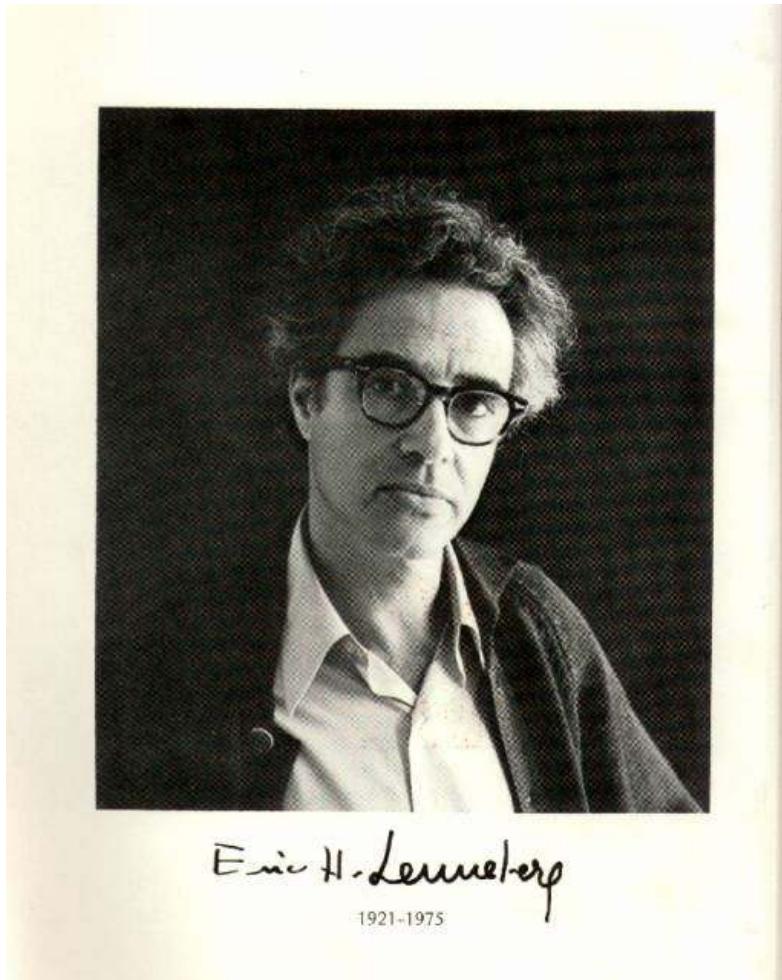
language influences thought. Lenneberg's argument against this notion was that 'linguistic and non-linguistic events must be separately observed and described before they can be correlated.

Affiliations

Lenneberg was quite involved in the scientific community, as he was a member of Phi Beta Kappa, Sigma Xi, the Linguistic Society of America, the American Psychological Association, the Society for Research in Child Development, and the American Association for the Advancement of Science.

Education

He attended primary school in Düsseldorf, Germany until 1933, when he moved to Brazil. In 1949, he received a B.A. from the University of Chicago. Lenneberg then went on to earn a Ph.D. in Psychology and Linguistics from Harvard in 1956.



BIBILOGRAPHY

1. Wikipedia, the Free Encyclopedia
2. Linguistic Purism in the History of German Language, Falco Pfalzgraf
3. Linguistic purism: How English fought for language purity
4. NCERT (esp. Ch. 7, Evolution)
5. Elisabeth Ahlsen, Introduction to Neurolinguistics

● ● ●

To the Secretary. Now after all these there is the h^{is} Princiall Secretary of Estate to he is intimaly acquainted wth all his Ma^{ts} affaires wh^{er} ther they haue relation to the weal publicke or to his own p^rivate & particular proceedings, hee's to the King such an Amazementis or hand, regester that his most secrett thoughts doe hard with,



18th May 1620.

1. To the Gent ^l w th ers dayly waiters	To the pages of the backe chaires	3. 6.
5.	To the Robes for the sword	2.
2. To the Gent ^l w th ers of the quyns chamber	To the Footmen	2.
5.	To the Trumpeters	2.
5. To the Heraldes al. Arms	To the porters	1.
5. To the Sierants al. arms	To the 4 Yeomen for the mowthe	2.
3. 6. 8. To the Knight Haxbinger	To the purveyors of the w ^{ys}	10.
To the Gent ^l w th ers quarter w ^{ys}	To the Drum Major	13. 4.
4. 2. 3.		Sum ^t 42. 16.
To the fewers of the Kings chamber	Received all these fees aboue mentioned for the knighthood of S ^r . Harry Bellingham his last of May 1620.	
To the Yeomen w th ers grommets	say received by me John Gostwold.	
To the pages of the b ^r chamb.		
2.		